

# National Cancer Institute

## caBIG® Knowledge Centers

U.S. DEPARTMENT  
OF HEALTH AND  
HUMAN SERVICES  
National Institutes  
of Health



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The cancer Biomedical Informatics Grid (caBIG®) initiative, overseen by the National Cancer Institute Center for Biomedical Informatics and Information Technology (NCI CBIIT), was conceived to connect the cancer research and clinical community through open, interoperable technology that facilitates data sharing and collaboration, speeding the translation of discoveries from research to clinical care. Since its inception, caBIG® has successfully launched innovative tools, infrastructure and policy resources that enable individuals and organizations in the cancer community and beyond to move further down the path to realizing personalized medicine.

For additional information about caBIG®, please visit <http://cabig.cancer.gov>.

## Knowledge Centers

Knowledge Centers are NCI-supported entities, each forming the nucleus of an expanding research and clinical community around the specific domains in which they have expertise. As authoritative repositories of knowledge and information about caBIG® tools, standards and infrastructure, the caBIG® Knowledge Centers provide the resources, expertise and support to enable broader caBIG® implementation across those domains.

caBIG® Knowledge Centers offer

- Domain expertise
- Comprehensive and up-to-date installation packages for caBIG® tools, including technical and end-user documentation
- Administration of open-source development of caBIG® tools by the community
- Collection and monitoring of defect reports, feature requests and end-user requirements
- caBIG® materials for trainers

The resources of each caBIG® Knowledge Center are Web-accessible and will include a searchable caBIG® Knowledge Base related to the technologies in its specific domain and suggested implementations to solve real-world problems.

The six initial Knowledge Centers are

### caGrid

caGrid is the underlying network architecture that provides connectivity among all of the cancer community institutions, allowing research groups to tap into the rich collection of emerging cancer research data and services while supporting their individual investigations. caGrid manages the secure sharing of data and analytic resources between diverse sites using locally administered access control policies.

The Ohio State University and The Ohio State Comprehensive Cancer Center with the University of Chicago and the Argonne National Laboratory

The Ohio State University, in partnership with the University of Chicago and the Argonne National Laboratory, has been the lead developer of caGrid since its initial release. Additionally, these organizations have wide experience developing domain-specific extensions and applications of caGrid (e.g., in imaging and cardiovascular research) on top of the core infrastructure. This Knowledge Center will help organizations that need a solution to integrate and grid-enable distributed applications that use caGrid as part of their existing software solutions or that use caGrid-enabled applications.

### Clinical Trials Management Systems

caBIG® provides a robust collection of interoperable software tools that support the conduct of clinical trials. These tools include software for managing study participant information (cancer Central Clinical Participant Registry, or C3PR), an application for scheduling and tracking patient encounters during the course of a study

(Patient Study Calendar, or PSC), a system for tracking and managing adverse events (cancer Adverse Events Reporting System, or caAERS) and a system for capturing, storing and routing clinical data (cancer Data Exchange, or caXchange), among others.

**Duke University Comprehensive Cancer Center with Northwestern University, Cancer and Leukemia Group B – Information Systems (CALGB-IS) and SemanticBits**

The Duke team includes key partners who have contributed widely to developing and implementing caBIG® clinical trials management systems tools. This Knowledge Center will help organizations that want to implement these tools to integrate and streamline their clinical research activities.

## **Data Sharing and Intellectual Capital (DSIC)**

Achieving technical interoperability in and of itself will not deliver the full benefits of accelerated translational research and expedited care for patients. The Data Sharing and Security Framework, developed by the DSIC Workspace, will provide policies, processes, model agreements and other resources to help evaluate the sensitivity of various data types and to facilitate data sharing with appropriate security.

**University of Michigan**

The team from University of Michigan has played a lead role in the DSIC Workspace. This Knowledge Center will continue and extend this work and provide resources and assistance to organizations concerned with sharing sensitive data locally and across integrated collaborative networks.

## **Molecular Analysis Tools**

The caBIG® molecular analysis tools provide powerful analytic capabilities for genomic data interpretation. Four key tools will be supported by this Knowledge Center: geWorkbench, which provides an innovative, open-source software platform for genomic data integration while bringing together analysis and visualization tools for gene expression, sequences, pathways and other biomedical data; GenePattern, which provides bioinformatics tools for gene expression, proteomic and SNP analysis; caArray, a system that supports the management and exchange of array data and annotations and caIntegrator, a novel translational informatics platform that allows researchers and bioinformaticians to access and analyze clinical and experimental data across multiple clinical trials and studies.

**Columbia University Herbert Irving Comprehensive Cancer Center with The Broad Institute of MIT and Harvard**

Columbia and The Broad Institute developed the first two tools and have helped facilitate their wide use; Columbia has firsthand knowledge of how caIntegrator can be adopted to support research needs. This Knowledge Center will help organizations integrate these life sciences tools into their research workflows.

## **Tissue/Biospecimen Banking and Technology Tools**

caTissue is the caBIG® tissue bank repository tool for biospecimen inventory, tracking and annotation. This tool enables users to monitor the collection, storage, quality assurance and distribution of specimens as well as the derivation and aliquotting of new samples from an existing one (e.g., for DNA analysis). It also allows users to find and request specimens for use in correlative molecular studies.

**Siteman Cancer Center, Washington University at St. Louis**

The Washington University team developed and supported the caTissue application (caTissue Core and caTissue Suite) and utilizes these tools to manage their own extensive biospecimen repository. This Knowledge Center will provide biospecimen repository domain experts, biomedical informaticians, software engineers, technical support specialists and training experts to support the implementation of technology for biospecimen management needs.

## Vocabulary

The ability of caBIG® tools to integrate information from disparate sources is dependent on the use of robust vocabularies. Such vocabularies are used throughout the caBIG® federation, both to code biomedical information and to underpin the semantics of information exchanged on caGrid.

### Mayo Clinic with SemanticBits

The Mayo Clinic team brings extensive experience in terminology development and management and has in-depth technical knowledge of LexBIG, Semantic Media Wiki and Protégé—the key tools in the caBIG® vocabulary domain. Semantic Bits will develop the online resources, including the knowledge base that delivers these vocabulary resources to those who want to build their own interoperable tools and systems.

## Imaging

caBIG® offers radiologists and pathologists the ability to store, annotate, search, retrieve, and distribute medical images. This Knowledge Center provides support for six key imaging services and applications, the most extensively developed of which are the National Biomedical Imaging Archive (NBIA), a searchable national repository integrating cancer images with clinical and genomic data, and the Annotation Imaging Markup (AIM) project, which proposes and creates a standard means of adding information to an image in a clinical environment. Additionally, the Knowledge Center supports In Vivo Imaging Middleware (IVIM), eXtensible Imaging Platform (XIP), Algorithm Validation Tools (AVT), and Imaging Workstations.

### University of Maryland

The Maryland Imaging Research Technologies Laboratory at the University of Maryland, School of Medicine shares its extensive experience with both the development and application of caBIG® imaging resources to address the real-world needs of researchers and radiologists.

Knowledge Centers may collaborate with **Support Service Providers**, a second ESN component to augment their overall support with the deep technical skills and implementation capabilities of these third-party organizations.

Visit <http://cabig.nci.nih.gov/esn/> to contact specific Knowledge Centers and Support Service Providers.



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